Page 78, line 23, delete "phosphotase" and insert --phosphatase--.

Page 79, line 20, after "Implants" and before "included", insert --that--.

Page 82, line 22, after "group" delete "II" and insert --I--.

Duplicate pages effecting these changes for placement in the file of the Patent Office are included for the convenience of the Examiner.

In the Claims

Delete claims 27, 30, 31, 47 through 49, 52 through 57, and 80.

Amend the remaining claims as follows:

21. (Amended) Osteogenic protein, produced by expression of recombinant DNA in a host cell, said osteogenic protein comprising a pair of polypeptide chains and capable of inducing endochondral bone formation in association with a matrix when implanted in a mammal.

22. (Amended) A protein, produced by expression of recombinant DNA in a host cell[,] and comprising [one or more] a pair of polypeptide chains, each of which has less than about 200 amino acids [long] in a sequence sufficiently duplicative of the sequence of COP-5 or COP-7 such that said pair of polypeptide chains, when ~~disulfied~~ bonded to produce a dimeric species, has a conformation [protein is] capable of inducing bone or cartilage formation in association with a matrix when implanted in a mammal.

Claim 23, line 2, before "molecular weight", delete "an apparent" and insert --a--.

Claim 25, line 2, before "molecular weight", delete "an apparent" and insert --a--.

Claim 26, line 1, delete "22" and insert --21--.

45. (Amended) The protein of claims ~~21 or~~ 22 comprising the product of expression of a DNA in a procaryotic host cell.

46. (Amended) A protein expressed from a genomic DNA sequence encoding an amino acid sequence sufficiently duplicative of that of the sequence encoded by the gene of

Figure 1A such that said encoded sequence, in dimeric form, induces bone or cartilage formation when implanted in a mammal in association with a matrix.

50. (Amended) [A cell line engineered to express] The protein of claim ~~21 or~~ 22 produced by expression in a mammalian cell line.

51. (Amended) The protein of claim ~~21~~ 22 having a half-maximum bone forming activity of at least about 20-25 ng per 25 mg of implant.

Add the following claims:

~~81~~. The protein of claim ~~21 or~~ 22 comprising the amino acid sequences:

$$\overset{10}{CX_1RX_2X_3LX_4VX_5FX_6DX_7GWX_8X_9WX_{10}X_{11}X_{12}PX_{13}GX_{14}X_{15}AX_{16}YC}\overset{20}{\qquad}\overset{30}{\qquad}$$

$$\overset{40}{X_{17}GX_{18}CX_{19}X_{20}PX_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}NHAX_{29}X_{30}QX_{31}}\overset{50}{\qquad}$$

$$\overset{60}{X_{32}VX_{33}X_{34}X_{35}NX_{36}X_{37}X_{38}X_{39}PX_{40}X_{41}CCX_{42}PX_{43}X_{44}X_{45}X_{46}}\overset{70}{\qquad}$$

$$\overset{80}{X_{47}X_{48}X_{49}X_{50}LX_{51}X_{52}X_{53}X_{54}X_{55}X_{56}X_{57}VX_{58}LX_{59}X_{60}YX_{61}X_{62}M}\overset{90}{\qquad}$$

$$\overset{100}{X_{63}VX_{64}X_{65}CX_{66}CX_{67}},$$

wherein X_1=(K or R); X_2=(H,R, or K); X_3=(P, S, E or Q); X_4=(Y, K or F); X_5=(D,S or E); X_6=(R, S, K or A); X_7=(V, L, or I); X_8=(N, Q, D or S); X_9=(D, E or N); X_{10}=(I or V); X_{11}=(I or V); X_{12}=(A or S); X_{13}=(P, E, L or K); X_{14}=(Y or F); X_{15}=(H or D); X_{16}=(F, Y or N); X_{17}=(H, E or S); X_{18}=(E or A); X_{19}=(P, A or Q);X_{20}=(F or Y); X_{21}=(L, M or I); X_{22}=(A, P or T); X_{23}=(D, E or K); X_{24}=(H or S); X_{25}=(L, M or F); X_{26}=(N or K); X_{27}=(S, A or P); X_{28}=(T or S); X_{29}=(I, V, or T); X_{30}=(V, I or L); X_{31}=(T or S); X_{32}=(L or I); X_{33}=(N, H or R); X_{34}=(S, A, F or N); X_{35}=(V or I); X_{36}=(P or S); X_{37}=(G or E); X_{38}=(K, Q, T or S); X_{39}=(I or V); X_{40}=(K or E); X_{41}=(A, P or S); X_{42}=(V or A); X_{43}=(T or E); X_{44}=(E, Q or K); X_{45}=(L or M); X_{46}=(S N or D); X_{47}=(A, S or P); X_{48}=(I, L or V); X_{49}=(S or A); X_{50}=(M, I or V); X_{51}=(Y or F); X_{52}=(L, F or Y); X_{53}=(D or N); X_{54}=(E, D or N); X_{55}=(N or Q); X^{56}=(E, D, S or K); X_{57}=(N or K); X_{58}=(V or I); X_{59}=(K or R); X_{60}=(N, K or H); X_{61}=(Q, E, R or P); X_{62}=(D, E or N); X_{63}=(V or T); X_{64}=(E, D or R); X_{65}=(G, A, S or E); X_{66}=(G or H); and X_{67}=(R or H).

~~82~~ 14. The protein of claim ~~21 or~~ ~~22~~ 1 comprising the amino acid sequences:

$LX_1VX_2FX_3DX_4GWX_5X_6WX_7X_8X_9PX_{10}GX_{11}X_{12}AX_{13}YC$

$X_{14}GX_{15}CX_{16}X_{17}PX_{18}X_{19}X_{20}X_{21}X_{22}X_{23}X_{24}X_{25}NHAX_{26}X_{27}QX_{28}$

$X_{29}VX_{30}X_{31}X_{32}NX_{33}X_{34}X_{35}X_{36}PX_{37}X_{38}CCX_{39}PX_{40}X_{41}X_{42}X_{43}$

$X_{44}X_{45}X_{46}X_{47}LX_{48}X_{49}X_{50}X_{51}X_{52}X_{53}X_{54}VX_{55}LX_{56}X_{57}YX_{58}X_{59}M$

$X_{60}VX_{61}X_{62}CX_{63}CX_{64}$,

wherein X_1=(Y, K or F); X_2=(D,S or E); X_3=(R, S, K or A); X_4=(V, L, or I); X_5=(N, Q, D or S); X_6=(D, E or N); X_7=(I or V); X_8=(I or V); X_9=(A or S); X_{10}=(P, E, L or K); X_{11}=(Y or F); X_{12}=(H or D); X_{13}=(F, Y or N); X_{14}=(H, E or S); X_{15}=(E or A); X_{16}=(P, A or Q); X_{17}=(F or Y); X_{18}=(L, M or I); X_{19}=(A, P or T); X_{20}=(D, E or K); X_{21}=(H or S); X_{22}=(L, M or F); X_{23}=(N or K); X_{24}=(S, A or P); X_{25}=(T or A); X_{26}=(I, V, or T); X_{27}=(V, I or L); X_{28}=(T or S); X_{29}=(L or I); X_{30}=(N, H or R); X_{31}=(S, A, F or N); X_{32}=(V or I); X_{33}=(P or S); X_{34}=(G or E); X_{35}=(K, Q, T or S); X_{36}=(I or V); X_{37}=(K or E); X_{38}=(A, P or S); X_{39}=(V or A); X_{40}=(T or E); X_{41}=(E, Q or K); X_{42}=(L or M); X_{43}=(S N or D); X_{44}=(A, S or P); X_{45}=(I, L or V); X_{46}=(S or A); X_{47}=(M, I or V); X_{48}=(Y or F); X_{49}=(L, F or Y); X_{50}=(D or N); X_{51}=(E, D or N); X_{52}=(N or Q); X^{53}=(E, D, S or K); X_{54}=(N or K); X_{55}=(V or I); X_{56}=(K or R); X_{57}=(N, K or H); X_{58}=(Q, E, R or P); X_{59}=(D, E or N); X_{60}=(V or T); X_{61}=(E, D or R); X_{62}=(G, A, S or E); X_{63}=(G or H); and X_{64}=(R or H).

83. The protein of claim 46 comprising the amino acid sequence:

```
          1       10          20          30          40
OP1             LYVSFRDLGWQDWIIAPEGYAAYYCEGECAFPLNS
                     50          60          70
          YMNATNHAIVQTLVHFINPETVPKPCCAPTQLNA
               80          90          100
          ISVLYFDDSSNVILKKYRNMVVRACGCH
```

84. The protein of claim 46 comprising the amino acid sequence:

```
                                                    5
                                                    HQRQA
          1       10          20          30          40
OP1       CKKHELYVSFRDLGWQDWIIAPEGYAAYYCEGECAFPLNS
                     50          60          70
          YMNATNHAIVQTLVHFINPETVPKPCCAPTQLNA
               80          90          100
          ISVLYFDDSSNVILKKYRNMVVRACGCH
```

85. A protein, substantially free of other contaminating proteins comprising the amino acid sequence:

```
          1       10          20          30          40
OP1             LYVSFRDLGWQDWIIAPEGYAAYYCEGECAFPLNS
                     50          60          70
          YMNATNHAIVQTLVHFINPETVPKPCCAPTQLNA
               80          90          100
          ISVLYFDDSSNVILKKYRNMVVRACGCH
```

86. A protein, substantially free of other contaminating proteins comprising the amino acid sequence:

```
                                                    5
OP1                                                 HQRQA
          1       10          20          30          40
          CKKHELYVSFRDLGWQDWIIAPEGYAAYYCEGECAFPLNS
                     50          60          70
          YMNATNHAIVQTLVHFINPETVPKPCCAPTQLNA
               80          90          100
          ISVLYFDDSSNVILKKYRNMVVRACGCH
```

87. A dimeric protein comprising the amino acid sequence:

```
            1       10          20          30          40
CBMP-2a     CKRHPLYVDFSDVGWNDWIVAPPGYHAFYCHGECPFPLAD
                    50          60          70
            HLNSTNHAIVQTLVNSVNSKIPKACCVPTELSA
                80          90          100
            ISMLYLDENEKVVLKNYQDMVVEGCGCR
```

88. A dimeric protein comprising the amino acid sequence:

```
            1       10          20          30          40
CBMP-2b     CRRHSLYVDFSDVGWNDWIVAPPGYQAFYCHGDCPFPLAD
                    50          60          70
            HLNSTNHAIVQTLVNSVNSSIPKACCVPTELSA
                80          90          100
            ISMLYLDEYDKVVLKNYQEMVVEGCGCR
```

89. A dimeric protein comprising the amino acid sequence:

```
            1       10          20          30          40
CBMP-3      CARRYLKVDFADIGWSEWIISPKSFDAYYCSGACQFPMPK
                    50          60          70
            SLKPSNHATIQSIVRAVGVVPGIPEPCCVPEKMSS
                80          90          100
            LSILFFDENKNVVLKVYPNMTVESCACR
```

90. A protein comprising the amino acid sequence:

```
            1       10          20          30          40
COP1            LYVDFQRDVGWDDWIIAPVDFDAYYCSGACQFPSAD
                    50          60          70
            HFNSTNHAVVQTLVNNMNPGKVPKPCCVPTELSA
                80          90          100
            ISMLYLDENSTVVLKNYQEMTVVGCGCR
```

91. A protein comprising the amino acid sequence:

```
            1       10          20          30          40
COP3            LYVDFQRDVGWDDWIVAPPGYQAFYCSGACQFPSAD
                    50          60          70
            HFNSTNHAVVQTLVNNMNPGKVPKPCCVPTELSA
                80          90          100
            ISMLYLDENEKVVLKNYQEMVVEGCGCR
```

92. A protein comprising the amino acid sequence:

```
          1        10          20          30          40
COP4            LYVDFSDVGWDDWIVAPPGYQAFYCSGACQFPSAD
                      50          60          70
          HFNSTNHAVVQTLVNNMNPGKVPKPCCVPTELSA
              80          90          100
          ISMLYLDENEKVVLKNYQEMVVEGCGCR
```

93. A protein comprising the amino acid sequence:

```
          1        10          20          30          40
COP5            LYVDFSDVGWDDWIVAPPGYQAFYCHGECPFPLAD
                      50          60          70
          HFNSTNHAVVQTLVNSVNSKIPKACCVPTELSA
              80          90          100
          ISMLYLDENEKVVLKNYQEMVVEGCGCR
```

94. A protein comprising the amino acid sequence:

```
          1        10          20          30          40
COP7            LYVDFSDVGWNDWIVAPPGYHAFYCHGECPFPLAD
                      50          60          70
          HLNSTNHAVVQTLVNSVNSKIPKACCVPTELSA
              80          90          100
          ISMLYLDENEKVVLKNYQEMVVEGCGCR
```

95. A protein comprising the amino acid sequence:

```
                                          10
COP16                                   PKHHSQRARKKNKN
          1        10          20          30          40
          CRRHSLYVDFSDVGWNDWIVAPPGYQAFYCHGECPFPLAD
                      50          60          70
          HFNSTNHAVVQTLVNSVNSKIPKACCVPTELSA
              80          90          100
          ISMLYLDENEKVVLKNYQEMVVEGCGCR
```

B8, cont

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